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SIGMA XI QUARTERLY

VOLUME I

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EDITORIAL COMMITTEE:

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Let the idea be before you that this is not a simple fraternity but that we are taking the lead in forming an ideal of modern scholarship in which literary elegance and facility while important elements are not the prime factors but in their place intellectual discernment and judgment and powers for using means to ends are of prime importance. And to cultivate this spirit in an institution should be the noblest aim of a chapter. * * * I would be jealous of granting a chapter anywhere that I thought [this spirit] was lacking.

From Address of President Henry S. Williams, October, 1896.

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THE ESTABLISHMENT OF NEW CHAPTERS

Among several questions of importance referred to committees at the Cleveland convention for report to the next convention were amendments to the constitution proposed by the Minnesota chapter concerning the granting of a charter for the establishment of a new chapter. It is evident that our present methods are cumbersome and should be simplified. The difficulties are similar to those which must be met in amending the constitution of the United States. But even our national government does not require the consent of three fourths of the states before a new state is admitted to the union.

According to our present constitution we must wait until a petition for a charter has been communicated to the president who must refer it to the chairman of the council. There are difficulties even at the outset; the president is a temporary officer, yet he appoints the chairman of the council. For the efficient conduct of a national society, there should be a central office with a permanent secretary conversant with its history and business. Such an officer we have in our corresponding secretary, yet he is ignored in the complicated correspondence in regard to a new charter, which is placed in the hands of temporary officers who may be efficient and well-informed or the reverse.

After the chairman of the council has received the petition he refers it to members of the council in all parts of the country, three-fourths of whom must answer in the affirmative. As members of the council have but few duties and small responsibilities, they are not likely to be extremely efficient, nor are they necessarily

the members of the society best informed in regard to the research work and other conditions in the universities of the country. It is difficult to get any answer at all from three fourths of them. Whether the answer is affirmative or negative would depend largely on the way the matter is presented. If by the perserverance of the chairman of the council a three-fourth majority is obtained, the president, not the chairman this time, must refer the question back to the chapters. At meetings which must be attended by half the active members, if they number fifty or less, three fourths of the chapters must give their consent.

The complicated procedure would be simplified by the amendments proposed by the Minnesota chapter. It seems possible, however, that the entire method could be altered to advantage. Unless the councilors of the chapters are the delegates to the annual conventions, they can scarcely be made an efficient body. It might be wise to transact all the business at the annual conventions, notice of important questions being previously given to the chapters so that they may instruct their delegates as they see fit. Then in a national society such as the Sigma Xi, there is apparently need of a small elected executive committee conversant with the history and aims of the society and with the scientific and educational situation of the country.

Such a committee, of which the corresponding secretary would naturally be a member, would at its own initiative or on receipt of a petition consider the advisability of granting a charter and its decision would be communicated to the chapters. At the next annual convention the charter could be granted if the delegates from three fourths of the chapters voted in the affirmative.

We are fortunate in the establishment of the *Sigma Xi Quarterly*, through which such questions can be brought to the attention of our widely scattered membership and adequately discussed.

J. McK. C.

REPORTS OF CHAPTERS

The records of officers on page 56 and opposite is not perfect but represents all the information which has been furnished to date by the various chapters. Unless chapter secretaries acknowledge the obligations of their positions sufficiently to furnish reports promptly, both their own chapters and others will be subjected to annoying delays and other inconveniences.

W.

THE IDEALS OF SIGMA XI

BY HENRY SHALER WILLIAMS

After reading the admirable history of the first quarter century of Sigma Xi my mind runs back to the examination of those germ-thoughts out of which such a vigorous and enthusiastic brotherhood has grown. Ideals I call them because as I try to fix my attention upon that which inspired us at the outset and now attracts 7000 of us to the meaningless symbol Sigma Xi. I find it is not the benefits we derive from the organization but the ideals we take into it that are of value. I remember when one of our chapters was struggling for existence in a great eastern university it was refused the use of the college rooms for its meetings on the ground that it was only another college fraternity.

To be sure the "*Friendship in Science*" were the opening words of the first Constitution, and a little further on we meet the phrase "*Brotherhood in Science and Engineering*," but as I went over those crude documents the following sentence it seems to me contains the germ-thought which in the passing years has made the Sigma Xi great; viz. "*To lend aid and encouragement to those newer brothers who likewise laboring in the same sphere are aspiring to honored positions.*" In those early days the pupil caught sight of some peculiar ability in his admired teacher, not found in books nor recognized in scholarship, which inspired him more keenly and attracted him more powerfully than all the degrees or other prizes of the university. He did not recognize it in the literary scholar; it was not learning nor was it poetic light; it seemed more evident in the laboratory than in the lecture room.

So again the teacher as he studied his pupils found here and there one among them who might be unlearned and untrained, getting poor marks compared with his more cultured fellows, but who surpassed them all in the quickness and clearness of his grasp of new ideas; to whom vision seemed natural; who called for no explanations; who knew how to know. These were congenial spirits, the teacher and the pupil were both alive to the same stimuli, and

tho scarcely reckoned in estimating the values of either teacher or pupil these qualities were prophetic of great attainments.

Teacher and pupil alike aspired for due recognition of these qualities of such paramount importance to their work. It was the attraction of this new ideal which drew together kindred spirits, welded them into an organic unity, and in every university in which a chapter has been established has gathered into Sigma Xi the most vigorous and the ablest scientific students in the institutions. Its constitution, its key, its name, its meetings, all the external clothing of the Sigma Xi, have served to preserve its identity in the eyes of the public, but I believe it is the ideals which they enclose, the penetrative, conquering, creative spirit of research which has preserved its vitality, and will continue to be the one reason for the existence of Sigma Xi.

Its source may be traced back not only to the "confluence of those two streams", as Professor Ward has called it; viz., the student eager to attain success with the teacher seeking to bring out the best in the pupil; but there are many influences contributing to the birth of the movement. A review of some of the chief terms by which the founders defined their purpose will show what they were.

Research and investigation are almost synonymous terms, but the *re* of research is the significant element. In selecting the term research to express our ideal we were protesting against the supposition that a truth or a bit of knowledge is exhausted by having been once investigated and defined. Definitions and laws and the formulae of science are human contrivances, made under particular conditions, based, may be, on fundamental propositions, but research does not stop with them. She looks past them, beneath them for the meanings that they hold. Like dogmas they must ever be recast to fit them to the issues of the present. Not only does the world move but we the observers of the world move, and our landscape changes with each new position occupied. This fundamental principle of research we discover applies not only to scientific investigation but to progress of all kinds. The spirit of research is not confined to the specialist in the laboratory but is becoming the dominating characteristic of the American people.

Scholarship is another term prominent in the early formulation of our ideals. As I look back after the twenty-five years of our history and ask what it was that led to the choice of this word I am inclined to think our minds were thinking of the great scholar rather than his scholarship. As a student in Yale College I knew and revered many distinguished leaders in scholarship, and (was it not

erroneously?) I imagined that it was their scholarship that made them great, strong, and successful beyond their fellows.

Now that the Sigma Xi has become of age, and many changes have come to knowledge, I discover that it certainly was not learning, a close synonym of scholarship, which was in mind. Learning is the quality which has made the Chinese to be one of the greatest people in the world. They have preserved their integrity as a race from the dim ages of the past. They have resisted the incursion and admixture of foreign influences while in other parts of the earth nations have been born, become great, and sunk back into oblivion. They have from the time of Confucius handed down the principles of human wisdom in a pure and simple form to the present day. They have clearly discovered truth, virtue, human justice and good government, but the quality they exhibit in supreme perfection is the power of standing still without losing strength or virility.

The Chinese are the antipodes of the modern American. By making this extreme comparison we discover the opposite directions in which we are led by the ideals of scholarship and those of research. And we see that what has been inspiring Sigma Xi to her best endeavors is not scholarly ambition but something else. It is not what we can learn from others or from books that we admire, it is not imitation of any kind, but it is the power of initiation.

Altho the chief function of our universities is educating their pupils in these scholarly lines, it is not their only task. It was Sigma Xi that called attention to this other quality equally needing the fostering, training, development and education of the University. To train in research ability it is necessary to give attention to the individual, to find out his peculiarities and personal capacities. It is something other than trimming him into a likeness to his fellows or adjusting him to some preconceived standard of perfection. We need to ask what is each man fitted to do and train him to do it better.

The training required to make a successful experimenter is a training of perception and judgement rather than of memory. He needs to appreciate, as by intuition, the world as it is about him; to see things in their true perspective, and to value them in the light of their actual relations to other things. It is an easy matter to determine the value of repeated action by comparing it with results of past experience; but there are no precedents to guide the initiator of new enterprises. The pioneer of a new country must carry his own compass and know how to feel his way in the dark. But at the same time it is true that research is not all. A knowledge

of what is already known is nowhere more important than in research. Whoever dares to deviate from the trodden paths must know them well; who would lift a heavy load must plant his feet solidly on the ground. Another word is conspicuous in the definitions of the ideal of Sigma Xi, the word promise. A misunderstanding of it has arisen in attempting to apply it in selecting candidates for membership. Promise is to be sure, contrasted with fulfillment and it is quite pertinent to argue: If our membership is to be based upon some definite quality why not wait until we have accomplished results as evidence of it?

But promise means more than non-fulfillment, it means purpose, potency, prophecy,—and when we combine it with research we find our ideal is very near akin to what Bergson so fascinatingly describes under the term impulse. We are familiar with the term good scholar as applied to a student. The term does not mean that he has produced any literary work of merit by which he can be distinguished from his fellows, but that he exhibits the learning capacity. He shows the power to grasp and retain information and express it in standard literary terms. When we give our attention to the creative rather than the retentive powers of the mind, promise has the same relation to the future which memory has to the past. This reaching after something still to be attained is the quality of mind to which the term promise is applied by Sigma Xi.

As we pick out athletes to train them for the race before they have run, by their vision of the goal and their determination to reach it, so in Sigma Xi, we may detect promise of ability for research by the readiness with which the student leans toward the undiscovered side of any subject under discussion, the eagerness with which he welcomes every new idea presented to his mind, and by the way in which he piles fact upon fact to lift himself into higher and broader understanding and comprehension.

These are the promises of ability for research we wish to give credit for, encourage, and train in our universities. The importance of detecting these powers early comes from the necessity of a thoro training for the man who shall succeed in reaching the higher goal of research. A man's life is limited, and his best productive days are not far ahead of his graduation. It is very easy to fall back into routine work, especially so to the successful scholar when he meets keen competition in life. Far easier to apply what he has learned than to press still forward to more strenuous tasks.

Most of us who have attempted a life of investigation and research find, after a life full of endeavor, that the field has simply broadened as we have advanced, and that the goals aimed at are

still in the far distance, a little clearer in view may be but still unattained. So Sigma Xi as an educational factor will be of great service if it succeeds year by year in detecting among the undergraduates only a few who in some marked degree exhibit this promise of ability for research, selects them, and gives them, not only the encouragement of elder brothers but the training required to fit them to enter into the life work of research.

Another term used in the original definition is modern, the meaning grows as we contemplate it. At first we naturally contrast modern with ancient, but we must notice that it is not its modernity that gives value to the things of to-day over those of the past. Modern includes the living present, and it is the living reality of the present which is contrasted with the dead memory of the past that interests us.

So when we describe our ideals as modern, we mean that we have tied ourselves to the ever moving present which advances with irresistible energy and which no conceivable force can either delay or hasten. The importance of this ideal consists in the impulsion it gives to our lagging footsteps telling us that to be really modern we must be incessantly advancing. Not only learning but science seems to be made out of the unchanging elements of memory. We need therefore to keep the word modern in mind and take firm hold of those elements of knowledge which change their appearance as they and we pass thru the ever changing conditions of the present. And now that we are still living at the end of a quarter century we may well acknowledge the temerity with which we burst into the world, preferring anything rather to die unborn.

A few of us, all young men with laurels still to be earned, solemnly banded together in competition with Phi Beta Kappa which at that time was recognized as representing the highest ideals attainable in any university in the land. We set out to give our members a place of honor among scholars while repudiating the validity of the current marking system. We labeled our organization with the Greek letters which at the outset had no meaning either to those inside or out. And as I have already noted, we adopted scientific research as our ideal none of us knowing anything of research but the promise of it. This was certainly a bold step to take—I can justify it only by the assumption that the ideals we fought for were worthy to live, and may we not hope that Sigma Xi will continue to be useful by fostering and developing her germinal ideals.

Guayabal, Cuba, May 9, 1913

A PLAN DESIGNED TO FURNISH MORE DETAILED INFORMATION AS TO THE DISTRIBUTION OF MEMBERS OF SIGMA XI

The rapid growth of the Society of Sigma Xi and the extension of its chapters to institutions differing greatly from each other in their facilities and aims, has resulted in a desire for a clearer definition of the requirements for admission. Where the membership of an organization is small and chartered by common interests of a professional and perhaps also of a social nature, there is little need for defining the status of the candidate for admission or of those who are already members. No matter how abstract the aims of a small group may be they acquire a coherence and unity from the greater homogeneity of its constituents, which it is futile to expect in a larger organization, even though the latter expresses its purposes much more concretely. If in addition to a large increase in membership there is a marked extension of the limits of those activities which furnished the original motives for organization, the need for a greater definiteness becomes acute.

Scientific methods are being pushed into many new lines of endeavor—industrial, philanthropic, economic, educational, etc., and with this extension we have a corresponding increase in the subject-matter of research investigation. Not only is the subject-matter increased, but the traditional criteria for evaluating research, are undergoing modification. Many of the members of Sigma Xi, especially those who enter by way of the Engineering schools, engage in industrial research which precludes publication and which tends to become separated from the traditional technical university research. Again, the advent of the Experiment Station has called out a class of men for whom research is almost compulsory and perhaps more directed toward the solution of merely local problems than is university research. While in industrial research the possibilities for collegiate recognition are practically negligible, in Experiment Station research every opportunity is given the investigator to publish his results. Of course "Science is science" no matter where it may be found, yet we cannot escape the fact that the methods

of presenting the material in an Experiment Station Bulletin are different from the methods which govern the presentation of research carried on in the regular university laboratory.

The intensive nature of research investigation tends to beget indifference toward lines of work which only remotely bound our prevailing interests. Not consciously perhaps, but whether consciously or unconsciously, the indifference so engendered soon manifests in a decreased participation in the affairs of the society. Considerations of this nature make the meaning of the term research vague and ambiguous. If the keynote of election to the Society of Sigma Xi is to be the "ability to do research", it is imperative that our conceptions of research become more objectified.

Toward this end the writer thought it might be profitable for the Society itself to undertake a piece of research which would have for its aim a statistical study of the distribution of its membership with respect to a few of the principles which are characteristic of Sigma Xi. Questions of administrative policy are difficult to handle when the actual composition of the society is indifferently known, and any definition of the requirements for admission should also consider the actual conditions as they at present exist. Any attempt at regulation must fail if these requirements are foreign to the spirit of the majority of the members. There must be a compromise between the extreme conditions. In the absence of such a compromise dissatisfaction and eventual dissolution may be confidently predicted. Every chapter has its own local problems and these seldom, if ever, coincide with the problems which the central committee must face. As a result, the recommendations of the central committee seem to be more or less foreign to every chapter unless the condition of the society as a whole is at the same time presented. The more comprehensive such an investigation may be the more intelligently can the recommendations of the national body be discussed, and the greater is the probability that some definite recommendations will be adopted. To learn that a certain percentage of Sigma Xi members are engaged in active research at this time may be worth the effort necessary to establish this fact; however, a classification shows in greater detail just how the members are distributed over the different fields of research would lend itself better for interpretative purposes.

If it were possible to confidently estimate the value of a given investigation, either with respect to its significance for pure science or to the extent to which it will benefit humanity generally the problem of classifying research would be simple. Unfortunately,

however, original investigations are of such a nature that many years may elapse before their real importance is recognized. Even then the recognition is not by any means unanimous and the controversy is greatest between the very men best qualified to determine their value. In view of these considerations it would perhaps be safest not to adopt a classification which carried with it any direct implications as to the scientific merit of its various classes. As an alternative the writer suggests a classification based upon the genetic development of research investigation. The earliest form of research was carried on by the universities as more or less supplementary to their prime function of teaching. The second stage was the development of the Experiment Station in which research was made the sole desideratum. Its investigators, however, are still more or less closely connected with the university. The third stage is that of industrial research in which there is no longer any direct connection with the university.

Using this genetic principle as a basis for classifying original investigators, we have—1. University research, 2 Experiment Station research, 3 Industrial research. Such a three-fold classification makes no attempt at evaluating the merits of the various investigations and at the same time the three groups are fairly well defined. This may not be the best classification; others could be suggested, but if the term research is to have a more concrete objective reference, some kind of differentiation should be made. Given some form of classifying the various kinds of research the question arises, what percentage of the members of SigmaXi belong to the various groups. For purposes of comparison the investigation might include five-year periods. This would indicate the tendencies which become manifest in the election of new members, and whether some groups are growing faster than others. The following are a few items which might also be classed as desirable information:

Percentage of the members at present engaged in research of any kind; percentage who have done no research since election; percentage holding positions in (1) University, (2) Experiment Stations, (3) Industrial establishments; percentage of members who did graduate work after election to the extent of securing their Ph.D. The representation of the Sigma Xi members with respect to their academic or technical antecedents (Arts and Science, Agriculture, Engineering, Medicine, etc.). This investigation could be conducted by a questionnaire where the available records are inadequate. The questionnaire could of course be much more comprehensive than is indicated in the preceding paragraphs. It would perhaps

also be better to restrict the investigation to a few representative institutions. Partly because the expense would be less, and also because the men who would be willing to devote their time to such an investigation would be limited.

It is often objected that it is impossible to clearly define such a purely personal and subjective thing as an ideal, or if it were possible that it would be undesirable. An investigation of the nature outlined does not attempt this. It aims merely to supply the members of the Sigma Xi with the actual facts as they exist. How these facts will be interpreted must, of course, be left to the individual. Intellectual agreement is no more possible than is an agreement on religion. We can, however, approach more and more closely to some acceptable compromise, and the investigation herein outlined is only a device by means of which the conditions for intelligent discussion are made more favorable. Certainly more so than if we must rely solely upon ill-defined and abstract principles of subjective evaluation toward which the investigator turns with reluctance because the very nature of his work requires him to have clear and clean-cut ideas.

The report of such an investigation in the hands of a committee would enable them to make recommendations as to the desirability or undesirability of standardizing the requirements for admission to the society, and if the members also have such a report before them the recommendations of the committee can be much more effectively discussed.

Desirable as the "platonic atmosphere" may be at banquets and initiations, it is rather ineffective when administrative policies are to be determined.

A. P. WEISS,

Ohio State University.

NOTE:

The Report of the Ohio Chapter at the Cleveland Banquet (see the Quarterly, p. 9) emphasized the importance of ascertaining what percent of the members of Sigma Xi actually do any research work after graduation. Professor Weiss was asked to formulate some plan for the work, and in response to this request outlines in this number the method in mind.

INITIATION ADDRESSES

PRESIDENT'S ADDRESS AT THE FIFTEENTH ANNUAL BANQUET AND INITIATION OF THE MINNESOTA CHAPTER, APRIL 12, 1910

BY FRANK H. CONSTANT

The Constitution prescribes that the President shall explain to the incoming members "the aims and objects of the Society." It is with some misgivings of my fitness for the task that I venture to give my own interpretation of its work and worth. But I am strengthened in this purpose by the fact that this has been a critical year in our history and that it is a meet time for us, both old and new members, to take counsel together to understand clearly what is our real "*raison d'être*". For in the past our ideals have seemed to be at cross purposes; we have tried to serve two masters. During the year these ideals have crystallized and it is found possible to make a practical program harmonize with these ideals. In this taking of stock, tonight, it will be necessary to be very frank with ourselves. Should I seem to undervalue any one's past election, remember that it applies with equal force to all of us older members. Have we since made good; are we now living up to the present standards of the chapter, is the only question we older members need really be sensitive about.

What is the Sigma Xi? It was organized in 1886 at Cornell. Minnesota was admitted in 1896 and was the sixth chapter. There are now 27 chapters and about 5200 members. Minnesota has a membership of 417. The aim of the society is clearly stated in the constitution and, in a word, is to encourage original investigation in science, pure and applied. This aim must have seemed rather visionary and indefinite to the founders for they immediately set about a work not mentioned at all in the constitution; viz., to supplement Phi Beta Kappa in the distribution of honors to undergraduate students, particularly those in the departments of applied science who are thus not eligible to Phi Beta Kappa. Thus Sigma Xi actually became an honor-bestowing society in pure and applied science along the lines parallel to and sometimes competitive with

Phi Beta Kappa. In our chapter and probably in all, the scientific bent of the society was recognized in not judging candidates wholly by marks but by some promise of future scientific achievement. But the average senior has little opportunity to prove his worth in research work. In the end the gauge of eligibility is essentially that of scholarship—of past achievement.

The initiations have always been stimulating and there for the first time the initiate learns of the real purpose of the society. He is encouraged to go forth to future achievement in research and thus prove the good judgment of the chapter in electing him. The admonition comes rather late and its emphasis too transitory to do much real good. The new undergraduate members have gone forth, proud—we hope—that their scholarship has received such honorable recognition; some to do distinguished service in science, the majority to enter the ordinary walks of life, few, however, to remember that Sigma Xi means anything to them for the future. To most Sigma Xi is a closed incident bound up with their college life.

As an honor-bestowing society this chapter has not been a marked success. Professor S. W. Williston, in his address before the Philadelphia convention on retiring from the office of national president, said; "As an honorary society I believe Sigma Xi may do some good, but if it existed for the purpose of giving honors only, it were better never born. To set ourselves apart as better than others, to expose our phylacteries in the public temples is not the object of Sigma Xi, tho unfortunately there are those who have thought so." The reason for our failure in this respect is obvious. True reward flows naturally and inevitably out of the work itself. It is found in the joy of the work, the satisfaction of achievement, the sense of growing power for greater things, the love of service, and, to some extent, in the glow of pleasure which the praise of fellow-workers brings. But this last to be of value at all should come spontaneously and to all in proportion to the work achieved. When we elect A to Sigma Xi and not B, whose work was nearly as good, we violate the principle that praise, to be of any worth at all, should be just and exactly proportional to achievement. Our method of election did not even create a stimulus of the game. One cannot strive to make Sigma Xi as he would work to become valedictorian. It is not surprising that the young men and women instinctively perceived the artificial character of the whole business and after the first appeal to their vanity looked upon Sigma Xi as a closed incident for them.

The professed object of the society is to encourage research. This has never been forgotten nor overlooked. Evidently here is a sufficient and inspiring field. The difficulty has been to find a practical method for such encouragement. It would be interesting if we could know the psychological history of each of the chapters and trace their intuitive groupings toward the light. A number are now out-and-out graduate chapters, electing only those who are actually engaged in research work. Doubtless most of them, starting as honor societies, like our own, are trying to reconcile the two aims, and with similiar success. Professor Tracy, in his presidential address at Yale in 1903, says:

"In electing the undergraduate the society is guided less by his marks than what the instructors who know him best really think of him. There is so much 'elbow teaching' in our scientific courses that the instructors have excellent opportunities not only to judge results, but to watch a man's methods and observe the spirit in which he works. As a matter of fact, however, in most cases a student's real ability in scientific work is pretty well indicated by his marks; for his work in science requires certain powers of the mind which the mere memorizer or bookworm does not possess. It thus happens that undergraduates elected to Sigma Xi usually have high marks, but the fact that men are sometimes elected who do not have high marks shows that the society does not make a man's marks the criterion for an election."

Here again we notice the effort to reconcile election by marks with the constitutional aim of the society. But while you may thus indicate a man's *ability* to do research you cannot forecast the future likelihood that he *will do such*. Most of them, having never started, never do research work at all. At Minnesota the proportion of new members to the active chapter is large; being, until this year, one-fifth of the senior class in the scientific departments. It can easily be seen that the essential character and, indeed, the ultimate fate of the chapter are thus bound up in the mode of election.

For the benefit of our new members, may I mention in a few brief words some of the guide posts which we have successively passed in our development which rather clearly indicate our present course and ideals.

1st. Election of new members, which at first rested in the chapter as a whole, in open meeting, inevitably resulting in hasty selection and an insufficient weighing of the qualifications of the nom-

inees, was placed in a small Board of Electors, who could take the time to investigate each nominee and thus uphold the current ideals of the chapter.

2nd. The Board of Electors more and more took the scientific ability of the candidate into consideration, often letting the latter out-weigh his marks in other departments. This year the Board insisted that not only his major, but his major interest should be in science, and so far as possible it was sought to learn if he would be likely to continue his scientific work in the immediate future.

3rd. If too large a proportion of non-research seniors are annually elected the real purpose of the society—the development of research—is, in a measure, lost sight of and the ideal life of the chapter is disturbed by so great an event in its annual history. To lessen this danger the chapter voted, this year, to reduce the limit from one-fifth to one-tenth of the senior classes in science. The nominations too, were made by colleges instead of by individuals. Last year thirty-five seniors were elected. Tonight we welcome eighteen, distributed among the colleges as follows:

College of Science, Literature and the Arts.....	4
College of Engineering.....	5
College of Medicine.....	4
College of Agriculture.....	3
School of Chemistry.....	2

Each one has already made a creditable record in science as a student, if not as an investigator.

4th. Graduate students are now required to have actually done research work. Tonight we welcome four graduates, every one of whom has already made a creditable beginning as an investigator and several of whom have already published results of their work.

5th. Likewise it is now expected that nominations among instructors be confined to those who are actively engaged in scientific investigation. In order that the members of the chapter may become better acquainted with a new instructor and his work, the chapter voted not to elect an instructor hereafter until his second year of residence. Tonight we welcome six brother instructors, every one of whom has done and is at present engaged in scientific investigation of a high class. It would have been a pleasant theme for this talk tonight to review briefly the scientific qualifications of all of our neophytes. We are proud of our freshmen.

6th. At the last meeting of the chapter the following motion was carried:

"The meeting for the election of members shall be held at the call of the President not earlier than May first of each year. The essential qualification for membership in the Minnesota Chapter of Sigma Xi shall be the successful prosecution of original research. Members of this society in making nominations shall present in detail evidence of the work done and of the fitness of the candidate. In making the selection among nominees who have done research work, the Board of Electors are instructed to consider in each case other factors, such as undergraduate scholarship and interest, time devoted to scientific studies, etc., which may furnish evidence that the candidate will contribute to the advancement of science."

It seems to me that at last the chapter has a clear vision of its real mission: after vicarious wanderings and much vexation of spirit it has entered into the promised land prepared for it from the beginning. The gradual shifting of the emphasis from the honor of past achievement to the importance of the present and future service discloses the real nature of Sigma Xi. The two letters Sigma Xi stand for "Companions in Zealous Research". "Companions" we are, in truth, simply a small band of scientific workers drawn together by the gravity of mutual tastes and work. The Society has all the ear marks of a fraternity, a true fraternity of kindred spirits bound together by the ties of like aims and ideals, by the common experiences of fellow-workers doing the same kind of service. Its membership is not bestowed arbitrarily upon some and withheld from others equally deserving. Every congenial spirit is sought out and will naturally gravitate into our ranks. It is only necessary that the link of congeniality be proven, that he love the things we love, that his ideals be our ideals, that his purpose in life be, so far as he is able, unselfishly to extend the bounds of science.

Such a fraternal association of the earnest scientific workers in the University should be most effective in keeping the lamp of research kindled. We have many department clubs but nothing so well adapted as this society to be the real center of all of the scientific activity as the University. There is no other club which makes companionship its motive. In this companionship lies the special opportunity of Sigma Xi to stimulate research—thru the mutual interest and encouragement which one earnest worker can have in and can give another, even when they are working in different fields.

Of course there will be a program which must in the first place provide frequent meetings for the growth of the fraternal relationship, and by means of lectures, departmental talks, reviews of recent research work expressed in simple language, keep each member in touch with what all of the other members are doing. This first-hand knowledge of the large amount of research work done here cannot be otherwise than most stimulating. In addition the chapter will want to propagate practical extrinsic policies from time to time, which will further the ends of science in the University. The chapter has come far this year. Something has been done toward a practical program and resolutions bearing upon this same matter are before us tonight. But there is still much to be done along this line and the construction of a good working program to govern the chapter life in the future (which we hope will be most active) is the next important problem demanding the attention of the chapter.

If I have in any way outlined the real meaning of Sigma Xi, a double obligation is placed upon us. We are expected to be zealous in research, to take an active part in its program. Let us pledge anew our loyalty to the principles of Sigma Xi and as workers both in and for scientific research, forge ever stronger the links binding us together into a strong brotherhood.

REMARKS TO THE NEW MEMBERS OF THE ILLINOIS CHAPTER*

BY G. A. MILLER, President of the Chapter.

Every active intellect naturally strives to penetrate the mysteries which encompass us. Two widely different methods have been followed to accomplish this end. The more common and easier of these methods refers everything to our own intellects, while the other aims to approach all questions with an unprejudiced mind and to gather data which seems to throw light on their solution. The latter is the method of the scientist and it involves endless labor. Among the millions of human beings who have preceded us there have been comparatively few scientists; comparatively few men have either collected facts of permanent value or based useful theories on such facts.

In recent years there has been a rapid change. Science has become more and more popular at an increasingly rapid rate. The advantages of recently discovered facts have entered so rapidly

*Read at the initiation of the new members, May 22, 1913.

into our lives as to remove all popular doubt in regard to the value of science. We need only to refer to the penetrating impression made about a year ago on the entire civilized world when the survivors of the Titanic owed their rescue to the recently discovered radiotelegraphy. Such wonderful recent discoveries as those which enable a perfectly blind man to hear light by means of selenium impress all most forcibly as regards the value of science in securing intellectual penetration and command of nature. In fact, they reach beyond science and serve to secure greater recognition for all higher education. Mrs. Hooper's recent million dollar gift to the University of California for medical research is but another instance of how the confidence in the value of science is aiding a higher education at the present time.

The popular interest in science has not been without evil consequences. It has brought many hypocrites into our ranks. The many respectable positions which this popularity has made possible have become a prey of the unscrupulous pretender, so that there is danger that we may lose the confidence of the public unless we bestir ourselves in the interest of the truth. It takes courage and disinterested devotion to truth to carry out the principles of the Society of the Sigma Xi. We are often compelled to bestow on only a few of our friends honors which we would so gladly make more general.

The people classed as scientists may be roughly divided into two classes—the workers and the bluffers. Probably comparatively few are purely of one or the other of these two types, but most of us could doubtless point to instances exhibiting a high per cent of purity. There is a common feeling that the workers receive relatively too little recognition, and that the progress and the dignity of science rests mainly on their shoulders. While workers naturally enlist our respect and sympathies, it should not be forgotten that results must be regarded paramountly in passing relative judgment. The man who digs with a spade where a steam shovel should be used, or who is so intent on his work that he forgets to sharpen his tools does not deserve our highest admiration.

The Society of the Sigma Xi welcomes heartily the younger workers who enter its ranks. The growth of science is peculiarly dependent on the spirit of the youth. The lack of experience is often more than compensated by a willingness to look at things as they are instead of through cloudy hypotheses. The University atmosphere is often purer than University experience, and the younger members of a University community have generally had a relatively

larger acquaintance with the former than with the latter. The openness and the honesty of youth, coupled with a sincere respect for new truths, tend to restore the zeal of many of the older workers. Hence we welcome you with a feeling that we are in need of just such a spirit as you bring.

We welcome you also because we need your strength. The problems of science are becoming more complex as we enter deeper, and the need of workers is constantly in the excess of the supply. The many ameliorations both physical and intellectual, due to recently discovered scientific facts inspire us with great courage. The proper dissemination of known truth is continually calling for higher attainments, and the regions opened up by the most successful investigators direct attention to many untouched resources. We are companions in research not only because we are social beings but also because the work is too great to be attacked alone.

In view of the magnitude of the problems we can scarcely expect extraordinary success as investigators unless we succeed either to fit ourselves admirably into the work of a good team or to attract to some comparatively neglected region a number of new workers by means of unusual discoveries. In either case companionship is essential. Hence our motto "Companions in zealous research" seems appropriate. It should be born in mind that this companionship is inspired by a view to scientific accomplishment and with the highest respect for these. Viewed through the Sigma Xi atmosphere the heads of the most successful scientific workers are enveloped by a beautiful halo, and even the slight scientific success awakens cordial interest and sympathy. As admiration is a strong element in friendship, the scientist may be largely judged by his attitude towards other scientists. High appreciation of scientific work naturally develops most cordial relations between scientific workers, and one of the objects of Sigma Xi is to afford opportunities to become directly acquainted with the scientific work of each other. The result of this should be more nearly scientific relations with those who work in somewhat different lines.

As the number of workers increase relative scientific eminence calls for higher and higher attainments, but the significance of such eminence becomes also more important. Unusual zeal and devotion are needed for some of the difficult problems which await solution. It is, however, a glorious work and may well awaken religious fervor. By defining science as the religion which seeks to get on the side of God without trying to get God on her side, we express a thought which has much truth in it. At any rate,

the truth seekers find much to inspire them in the works of the greatest teachers of religion and morality.

In bidding you welcome to the Society of the Sigma Xi we would explicitly direct your attention to the fact that all the sciences as well as their applications come within our domain. In view of the interaction between various sciences it is necessary that all should advance and that our sympathies should be also with those who may not be working in our own corner. Most of us have to devote our main energy to comparatively narrow regions to make any real advances, but none of us can afford to center our entire interest on these special regions. Science is a unit and it has a common language. The confusion of tongues is one of our grave dangers and the lesson of the tower of Babel demands our serious attention. Simplified scientific language is needed more than simplified spelling.

It is true that the scientific language is big and growing rapidly, and that one man cannot expect to understand all the technical terms. It is, however, equally true that as our knowledge grows it is generally possible to put things into simple language, and that a wide acquaintance with related fields is often of great service in stating new results in the simplest as well as in the most useful form. At any rate, we trust that the fellowship which your membership in the Society of the Sigma Xi makes possible will have a helpful influence on your scientific life in many ways, and that the principle which it symbolizes, to encourage the gifted by scientific recognition, may find many expressions in your lives.

The most inspiring view of the big army of workers which you now formally enter is furnished by its high ideals and by the permanent value of the work which it aims to accomplish. May you always be inspired by these high ideals and by the dignity of the objective points, and may you not waste too much of your time on trivial points of organization or be disheartened by the shortcomings which are too common in such large bodies. On the other hand, let us not forget that the most helpful members of an organization are those who are actuated by its central thought and who help to correct its weaknesses. The Society of the Sigma Xi stands for light on scientific weakness and on scientific strength, within and without. This may tend to make us more modest but it will also tend to make us stronger for good. We welcome you because we know that some of you have already spread this light in an eminently successful manner, and because we believe that the rest of you have given such evidence of ability and zeal as to justify our faith in you as "Companions in zealous research."

CHAPTER REPORTS

THE MICHIGAN CHAPTER.

In as much as both the Senior and Junior Clubs of the University of Michigan held regular monthly meetings during the academic year 1912-1913, only three regular meetings of Sigma Xi have been called. At the first regular meeting held December 9, 1912, Dr. A. G. Ruthven, Director of the Zoological Museum, spoke on The University Expeditions into Mexico and Western United States. On April 1, 1913, Dr. G. Carl Huber, Professor of Histology and Embryology, addressed the Society on the Early Stages of Mammalian Development. The last regular meeting, held May 28, 1913, was addressed by Professor Frederick G. Novy, Professor of bacteriology, his subject being The Sanitation of the Panama Canal. At this meeting held at the Michigan Union, the annual dinner was served and the newly elected members subscribed to the pledge. Officers were elected at this time.*

The following persons were elected to membership in the Society:

Bradshaw, John William, Ph.D. Mathematics. Faculty member.

The Logarithm as a Direct Function. *Annals of Mathematics*, 2nd ser., vol. 4, 1903, pp. 51-62. Ueber die Flächendichtigkeit der Elektrizität auf unendlich langen Cylindern. Doctor's thesis. Also other publications.

Menefee, Ferdinand Northrup, C.E. English. Faculty member.

A Comparison of Gravity and Arch Domes. *Mich. Technic*, Feb., 1913. The Efficiency of Hand Welds. *Mich. Technic*, March, 1913. Also other publications.

Smith, Arthur Whitmore, Ph.D. Physics. Faculty member.

Energy Loss in Condensers. *Phys. Rev.*, vol. 8, 1899. Heat of Fusion of Ice. *Phys. Rev.*, vol. 17, 1903. Battery Resistance by Mance's Method. *Science*, vol. 22, 1905. Other publications.

Ware, Elmer Edwin, B.S. Chemical Engineering. Faculty member.

Paints: Their Service Condition. N. Dak. Gov. Expt. Station, 1911. Control of Initial Setting of Portland Cement. *Jour. Ind. and Eng. Chem.*, May, 1913.

*See list on page 56.

- Barber, Bertram Alpha. Resident graduate.
Melophaga of Birds with special reference to Life Histories.
- Barker, Ernest Franklin. Resident graduate.
The Relation between the Specific Heats of Phosphoric Acids
and their Concentrations.
- Cheyney, Ernest Waldron. Resident graduate.
Site Requirements of City Shade Trees.
- Coffin, Leroy Melville. Resident graduate.
The Orbit of Comet C 1912.
- Conover, Charles Junius. Resident graduate.
Methods for Combating Forest Insect Depredations.
- Corless, George Bradford as of the class of 1912. Resident graduate.
ate.
Water Resources of United States.
- Crump, Clifford Charles Cook. Resident graduate.
The Orbits of Three Short Periods Spectroscopic Binaries.
- DeCamp, Joseph Edgar. Resident graduate.
The Curve of Retroactive Inhibition.
- Ehlers, John Henry. Resident graduate.
Temperature of Conifer Needles in Winter Compared to that
of air.
- Foult, Howard Vanton. Resident graduate.
Mental Inertia.
- Goldsberry, John Philip. Resident graduate.
Composition of Bornite.
- Hess, George Wellman. Resident graduate.
An Investigation of the Computation of the Heliocentric radii
vectores in a Parabolic Orbit.
- MacKay, Sarah Davina. Resident graduate.
A Problem in Logical Memory.
- Mellor, Lewis Leroy. Resident graduate.
An Investigation of the Titanium Spark Spectrum for use of
a Comparison in Stellar Spectroscopy.
- Quick, Bert Edwin. Resident graduate.
Development of River Flora of Southern Michigan.
- Reeves, Cora Daisy. Resident graduate.
The Breeding Habits of the Rainbow Darters. Biol. Bull.,
vol. 14, Dec., 1907. A Remedy for the Blackfly Pest in
Certain Streams of S. Peninsula of Michigan. 12th Re-
port Mich. Acad. Sc., 1910.
- Richards, Joseph Lovering. Resident graduate.
Season and Region of Current Growth of Twigs.

Robinson, Wilber Irving. Resident graduate.

A Study of Cambrian Trilobites.

Snedecor, George Waddel. Resident graduate.

A Study of the Thermal Conductivity through Metallic Joints.

Thompson, Helen. Resident graduate.

The Amphibians of Michigan. Ann. Rept. Geol. Surv. Mich.,

1912. Reptiles and Amphibians of Chariety Island. 14th.

Ann. Rept. Mich. Acad. Sc., 1912. Notes on the Wisconsin Wood Frog. 14th. Ann. Rept. Mich. Acad. Sc., 1912.

And other publications.

Tucker, David Andrew. Resident graduate.

The Oxygen Content of the Water of Douglas Lake, Michigan.

Walsh, George William. Resident graduate.

Site Factors on Sprout Growth of Red Oak.

Woodward, Alvalyn Eunice. Resident graduate.

The Orthoptera Collected at Douglas Lake, Michigan, 1910.

Mich. Acad. Sc., 1911.

Also as Undergraduate members in the literary department:

Barrett, Leslie Park

Mains, Edwin Butterworth

Braun, Nora Regina

Minor, John Rice

Buck, Zeltah Pauline

Raphael, Theophile

Ehlers, George Marion

Reed, Anna Gertrude

Fritch, Giles Morton

Shambach, Jesse Yetter

Hornby, Lloyd Gibson

Voigt, Alfred Wolf

Lamb, Newton

Wenzel, Orrin John. Observations on the Mammals of the Douglas

Lake Region, Michigan. Mich. Acad. Sc., 1911. A Collection

of Mammals from Osceola County, Michigan. Mich. Acad.

Sc., 1913.

From the engineering department:

Braden, Alfred Taylor

Haskins, Frank Devillow

Brown, George Franklin

Hughes, Stanley

Davidson, Ward Follett

McGivney, Thomas Francis

Depew, Harlan Armstrong

Preble, Norman Hosmer

Drury, Walter Rhodes

Saulson, Saul

Fletcher, Philip Kingsbury

Wade, Jephtha A.

Freund, Walter Frederic Wm.

Weaver, Frank Lloyd

Gibbs, Frank Cornelius

Whelan, Charles Mallory

Grove, William Arthur

Wickenden, Thomas Howard

Hancock, James Edwin

Wirth, Carl Kingsley

Hart, Arthur Kline

Woolfstyn, Carl Edward

Hartsig, Emory Reid

From the medical department:

- Marshall, Malcolm Yeaman, A.B. Reye, Heinrich, A.B.
Weller, Carl Vernon, A.B. Primary Carcinoma of the Larger
Bronchi, etc. Arch. Internal Med., vol. 11, p. 314-333.
Wood, Carleton Ira, A.B. The Effect of a Skin Irritant on the
Local Blood Flow in the Hand. Arch. of Internal Med.,
Sept., 1912.

According to the by-laws, published research is made a prerequisite for faculty membership. Graduate students who are engaged in research along scientific or technical lines, and undergraduates who by their high scholarship show promise of research are likewise eligible. In determining the representation from the Department of Literature, Science, and the Arts, students who have taken the majority of their work in the last two years in the biological, physical, and mathematical sciences are considered eligible. However, the undergraduate membership from any scientific or technical department can not exceed ten per cent of the graduates in that department.

WALTER F. HUNT,
Secretary.

THE MISSOURI CHAPTER

During the year the following open meetings were held: December 4, 1912, The Earliest Land Animals, by Dr. Samuel Wendell Williston, Professor of Paleontology in the University of Chicago, and Past President of the Society of Sigma Xi; December 5, 1912, The Laws Governing the Evolution and Distribution of the Earliest Land Animals, also by Dr. Williston; February 1, 1913, The Backward Child, by Dr. Arthur Holmes of Pennsylvania State College.

At the annual meeting, April 4, 1913, the officers were elected.* At the same meeting the following were elected to membership:

F. V. Emerson, A.B., Ph.D., Instructor in Geology.

A Geographical Interpretation of Missouri: Royal Geographical Journal, London; four other publications during the past year, and many others previous to 1912.

Addison Gulick, A.B., A.M., Ph.D. Instructor in Physiology.

The Fossil Land Shells of Bermuda: Proc. Acad. Nat. Sci., Phila., and other important work.

J. P. Bennett, A.B. Assistant in Botany. Graduate Student.
Preliminary List of the Rusts of Boone County, Missouri.

*See list on page 56.

- A. L. Jones, B.S., A.M. Assistant in Pathology, graduate student.
A Cytological Study of the Development of the Functional Activity of Nerve Cells in Fetal and Infantile Animals.
- P. E. Karraker, graduate student.
A Study of the Effect of Ground Limestone on the Innoculation and Growth of Legumes under Certain Conditions.
- T. K. T. Kruse, A.B. Assistant in Physiology, graduate student.
The Pharmacological Action of Certain Bromide Salts.
- M. W. Lowry, B.S. in Agr., graduate student.
The Composition of Soils as Affected by Different Cropping Systems.
- J. R. McVay, A.B. Assistant in Physiology, graduate student.
On the Pharmacological Action of Certain Organic Derivatives of Arsenic with Special Reference to Salvarsan and Sodium Cacodylate.
- B. E. Shackelford, A.B. Assistant in Physics, graduate student.
Absolute Determination in the Electrical Capacity of a Condenser.
- C. W. Bock, undergraduate student.
A Psychological Investigation of Efficiency in Typewriting.
- S. M. Hardaway, undergraduate student.
Some Peculiar Rotating Field Phenomena.
- A. J. Heinicke, undergraduate student.
The Killing of Plant Tissue by Low Temperatures.
- C. A. Helm, undergraduate student.
The Shrinkage of Corn.
- R. A. Kinnaird, undergraduate student.
Investigations in Mechanical and Physical Properties of Soils.
- M. D. Ott, undergraduate student.
Effect of Inanition upon Structure in White Rats.
- E. L. Overholser, undergraduate student.
A Study of Balanced Solutions in Plant Cultures.
- J. H. Pound, undergraduate student.
Loss of Fuel thru Grates.

OPEN FORUM

NEW HAVEN, CONN., June 14, 1913.

To the Editors of The Sigma Xi Quarterly:

You and your readers may be interested in a new departure at Yale which concerns Sigma Xi. It was felt last year by the authorities that the scholarly aspect of commencement might be even more emphasized. Some way was sought, therefore, that might involve our two honorary societies, namely, Phi Beta Kappa and Sigma Xi. A program was eventually arranged which proved very satisfactory and it is to be repeated, with some changes, this year.

The exercises are held in the chapel immediately preceding the alumni meeting on Tuesday morning of commencement week. They are limited to one-half hour so that they will not be tiresome. This year Professor William H. Taft is to preside.

After the singing of *Integer Vitae* by a Glee Club quartette and introductory remarks by the presiding officer, a chosen undergraduate member of Phi Beta Kappa will give a ten minute speech on some topic of undergraduate interest. Following him an undergraduate member of Sigma Xi will likewise give a speech. After this the Dean of Yale College reads the honor appointments in Yale College and the Director of the Sheffield Scientific School those for scientific work. The exercises close by the singing of *Gaudeamus Igitur*.

The whole occasion is given considerable dignity by the fact that the presiding officer, the two undergraduate speakers, the president of Sigma Xi, and the president of Phi Beta Kappa will be on the platform in their academic gowns. According to those who were present last year, the exercises served decidedly to lend additional seriousness to commencement.

Yours very truly,

ROSWELL P. ANGIER,
President, The Yale Chapter of the Society
of the Sigma Xi.

MEMBERSHIP OF SIGMA XI
STATISTICS FOR 1912

Number	Chapters Name	Totals for 1911*	Elected in 1912					Total Membership Classified				Totals for 1912	
			Undergraduates	Grad'te Students	Faculty Members	Alumni Members	Charter Members	Undergraduates	Grad'te Students	Faculty Members	Alumni Members	Grand Totals	Active Membership
1	Cornell	1070	21	34	5	....	13	537	397	134	49	1130	144
2	Rensselaer	208	22	40	0	....	7	207	40	16	.....	270	29
3	Union	164	8	1	1	....	15	14	99	39	7	174	12
4	Kansas	286	24	4	3	....	5	196	35	58	23	317	56
5	Yale	597	28	12	6	....	20	351	179	91	2	643	125
6	Minnesota	334	1	8	1	....	18	232	44	49	1	344	101
7	Nebraska	287	13	9	1	....	13	93	156	40	8	310	70
8	Ohio State	324	21	4	3	....	28	175	48	66	35	352	86
9	Pennsylvania	440	18	2	0	....	12	272	60	90	26	460	128
10	Brown	168	10	1	1	....	28	83	45	10	14	180	35
11	Iowa	182	8	5	2	....	12	92	52	41	.....	197	61
12	Stanford	180	5	16	2	....	14	12	90	47	40	203	53
13	California	393	25	12	3	....	16	143	167	98	9	433	103
14	Columbia	376	17	14	6	....	22	149	188	21	33	413	101
15	Chicago	425	0	38	2	....	62	4	363	31	5	465	201
16	Michigan	443	41	7	3	....	36	310	66	80	2	494	125
17	Illinois	467	24	18	4	....	39	255	85	130	4	513	212
18	Case	161	9	0	10	....	17	86	.....	33	44	180	21
19	Indiana	101	0	12	1	....	14	16	53	26	5	114	35
20	Missouri	161	18	6	3	....	23	80	33	51	1	188	63
21	Colorado	90	1	0	4	....	14	19	24	38	.....	95	42
22	Northwestern	90	1	3	1	....	27	28	22	15	3	95	41
23	Syracuse	85	0	8	3	....	16	.....	43	32	5	96	50
24	Wisconsin	177	0	10	20	....	42	.....	25	116	24	207	145
25	Washington State.....	70	6	2	4	....	27	27	9	18	1	82	36
26	Worcester	83	15	1	1	....	18	67	5	9	1	100	26
27	Purdue	72	11	0	2	....	21	32	.....	32	.....	85	48
28	Washington Univer...	46	5	7	2	....	12	20	7	14	7	60	27
			352	274	94	....	591	3500	2335	1425	349		
	Totals for 1912			720				8200				8200	2176

*Taken from Quarter Century Record and History.

All other figures taken from reports of Chapter secretaries for 1912.

The two defunct chapters enrolled 18 members not included in the totals as given in the table above.

CHAPTER OFFICERS
LIST FURNISHED BY THE CORRESPONDING SECRETARIES OF THE CHAPTERS.

CHAPTER	PRESIDENT	VICE-PRESIDENT	REC. SECRETARY	COR. SECRETARY	TREASURER
Cornell	R. C. Carpenter..	A. W. Browne...	F. K. Richtmyer..	James McMahon..	W. A. Riley
Rensselaer	E. R. Cary.....	H. H. Carrington.	C. H. Andros....	E. F. Chillman..	E. F. Chillman..
Union	Olin H. Landreth.	Howard Opdyke..	Morland King....	J. H. Cunningham.	Chas. F. F. Garis
Kansas	P. F. Walker.....	H. P. Cady.....	U. G. Nutchell....	W. J. Baumgartner.	W. H. Twenhofel
Yale	Roswell P. Angter.	Wm. A. Drushel..	Harold S. Palmer.	Joseph W. Roe....	H. M. Dadourian
Minnesota	F. E. Clements...	John B. Johnston.	Wm. H. Bussey...	David F. Swenson.	A. L. Underhill
Nebraska	H. H. Waite.....	Geo. Borrowman.	V. L. Hollister...	A. L. Candy.....	L. B. Tuckerman, jr
Ohio	D. S. White.....	J. S. Hine.....	J. R. Withrow....	J. R. Withrow....	F. C. Blake
Pennsylvania	Allen J. Smith...	J. M. Macfarlane.	Maurice J. Babb..	J. W. Harshberger.	I. P. Moore
Brown	Ansel Brooks....	Charles W. Brown	R.G.D. Richardson.	T. M. Phetteplace.	Philip H. Mitchell.
Iowa	Carl E. Seashore..	Geo. W. Stewart..	Fay C. Brown....	G. L. Houser....	Robert B. Wylie
Stanford	Robert E. Swain..	W. K. Fisher....	Leroy Abrams....	LeRoy Abrams....	LeRoy Abrams
California	Frederick Slate..	A. S. Eakle.....	Elmer E. Hall....	Edmond O'Neill..	I. N. LeConte
Columbia	George F. Sever..	Arthur L. Walker.	H. E. Hawkes....	Chas. P. Berkey..	H. E. Hawkes
Chicago	John M. Coulter..	A. P. Matthews..	H. I. Schlesinger.	J. Stieglitz.....	H. I. Schlesinger
Michigan	Wm. C. Hoad.....	Ermine C. Case..	Walter F. Hunt..	Walter F. Hunt..	Geo. R. LaRue
Illinois	G. A. Miller.....	H. W. Mumford..	Edward Bartow..	C. G. Derick.....	T. E. Savage
Case	T. M. Focke.....	F. R. Van Horn..	W. J. Sweetser..	C. D. Hodgman..	C. D. Hodgman
Indiana	Aug. G. Pohlman.	M. E. Haggerty..	Mrs. F. N. Andrews.	Cora B. Hennel..	John B. Dutcher
Missouri	Herman Schlundt.	W. C. Curtis....	A. Lincoln Hyde..	E. J. Durand.....	Chas. W. Greene
Colorado	A. R. Peebles....	R. D. George....	P. G. Worcester..	Ira M. DeLong...	Ira M. DeLong
Northwestern	John H. Long....	Olin H. Basquin..	Robt. E. Wilson..	Geo. R. Mansfield.	Robt. E. Tatnall
Syracuse	Chas. W. Hargitt..	E. H. Archibald..	Chas. G. Rogers..	Chas. G. Rogers..	F. F. Decker
Wisconsin	Horace B. Byers..	L. R. Ingersoll..	Walter J. Meek..	Chas. Elmer Allen	Otto L. Kowalke.
Washington State.	Chas. F. Burgess..	John Weinzi..	Robert E. Rose...	H. C. Stevens....	Geo. S. Wilson
Worcester	W. L. Jennings..	Joseph O. Phelon.	D. F. Calhane....	Howard C. Ives..	Francis W. Roys
Purdue	Stanley Coulter..	W. E. Stone.....	C. G. Woodbury..	R. L. Sackett....	R. G. Dukes
Washington Univ.	Francis E. Nipher.	William Trelease.	W. E. McCourt..	Ernest L. Ohle...	J. F. Abbott

Including Chapter Reports received up to June 15, 1913

COUNCIL OF THE SOCIETY OF THE SIGMA XI

PRESENT OFFICERS

J. McKEEN CATTELL, President	Columbia University, New York City
JOHN H. LONG, Vice-President	Northwestern University, Evanston, Illinois
DAYTON C. MILLER, Recording Secretary	Case School of Applied Science, Cleve- land, Ohio
HENRY B. WARD, Corresponding Secretary	University of Illinois, Urbana, Illinois
J. F. KEMP, Treasurer	Columbia University, New York City

PAST PRESIDENTS

HENRY S. WILLIAMS (1895-1901)	Cornell University, Ithaca, New York
S. W. WILLISTON (1901-1904)	Chicago University, Chicago, Illinois
E. L. NICHOLS (1904-1909)	Cornell University, Ithaca, New York
F. O. MARVIN (1909-1910)	University of Kansas, Lawrence, Kans.
H. T. EDDY (1910-1912)	University of Minnesota, Minneapolis, Minn.

CHAPTER REPRESENTATIVES

TERM ENDING JANUARY 2, 1913*

Rensselaer—C. W. CROCKETT	Washington University—F. E. NIPHER
Stanford—H. J. RYAN	Wisconsin—V. LENHER

TERM ENDING JANUARY, 1914

Case—C. S. HOWE	Nebraska—E. W. DAVIS
Chicago—JULIUS STIEGLITZ	Northwestern—WM. A. LOCY
Iowa—THOS. H. MCBRIDE	Ohio—EDWARD ORTON, JR.
Kansas—E. H. S. BAILEY	Worcester—A. W. ELWELL
Minnesota—H. T. EDDY	

TERM ENDING JANUARY, 1915

Columbia—C. C. CURTIS	Syracuse—W. H. METZLER
Cornell—H. S. WILLIAMS	Union—OLIN H. LANDRETH
Indiana—C. H. EIGENMANN	Washington State—HENRY LANDES
Missouri—O. M. STEWART	Yale—JOHN C. TRACY
Pennsylvania—E. F. SMITH	

TERM ENDING JANUARY, 1916

Brown—ALBERT DE FOREST PALMER	Illinois—S. A. FORBES
California—J. C. MERRIAM	Michigan—KARL E. GUTHE
Colorado—FRANCIS RAMALEY	Purdue—C. H. BENJAMIN

Chairman of the Council.....JULIUS STIEGLITZ (Chicago)

According to the Constitution the terms of all national officers end with the annual convention which comes at the close of the period for which they were elected. Nevertheless officers all serve until their successors are elected.

*The election of their successors has not been reported to date.

ANNOUNCEMENT

The General Convention has instructed the Secretary to keep for chapters a supply of printed blanks as enumerated below. According to instructions these are to be forwarded to chapters under the following stipulations:

Membership Certificates, stamped with the great seal of the Society. In packages of fifty prepaid, on advance of payment of \$2.50 for each package.

Index Cards, on the condition that a duplicate set be sent for the general index of the Society maintained in the secretary's office. Gratis on demand.

Report Blanks, for submitting annual reports giving chapter officers, elections, and other statistical data. Gratis on demand.

SIGMA XI PUBLICATIONS

It has been proposed to bind up a number of sets of important early documents regarding Sigma Xi and to place a set in each of a selected series of the leading libraries of this country.

The undersigned will be glad to receive copies of such publications relating to the Society in general or to any one of its chapters which those interested may be able and willing to furnish for this purpose.

HENRY B. WARD.